

Clean Air Issues in the 111th Congress

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Summary

EPA regulatory actions on greenhouse gas (GHG) emissions using existing Clean Air Act authority have been the main focus of congressional interest in clean air issues in recent months. Although the agency and the Obama Administration have consistently said that they would prefer that Congress pass legislation to address climate change, EPA has begun to develop regulations using its existing authority. On December 15, 2009, the agency finalized an “endangerment finding” under Section 202 of the Clean Air Act, which permits it (in fact, requires it) to regulate pollutants for their effect as greenhouse gases for the first time. Relying on this finding, EPA finalized GHG emission standards for cars and light trucks, April 1, 2010. The implementation of these standards will, in turn, trigger permitting requirements and the imposition of Best Available Control Technology for new major stationary sources of GHGs in January 2011.

It is the triggering of standards for stationary sources (power plants, manufacturing facilities, etc.) that has raised the most concern in Congress: legislation has been introduced in both the House and Senate aimed at preventing EPA from implementing these requirements. The legislation has taken several forms, including the introduction of resolutions of disapproval for the endangerment finding itself under the Congressional Review Act, and stand-alone legislation that would forestall specific EPA regulatory actions. Meanwhile, EPA has itself promulgated regulations and guidance that will limit the applicability of Clean Air Act GHG requirements, delaying the applicability of requirements for all stationary sources until 2011 through guidance published April 2, 2010, and focusing its regulatory efforts on the largest emitters while granting smaller sources at least a six-year reprieve through what it calls the Greenhouse Gas “Tailoring Rule.”

The endangerment finding and EPA’s other actions, which were triggered by a 2007 Supreme Court decision, came as Congress struggled with climate change and energy legislation. On June 26, 2009, the House narrowly passed H.R. 2454, a 1,428-page bill addressing a number of interrelated energy and climate change issues. The bill would have established a cap-and-trade program for greenhouse gas (GHG) emissions, beginning in 2012. In the Senate, both the Environment and Public Works Committee and the Energy and Natural Resources Committee reported bills (S. 1733 and S. 1462), but action subsequently bogged down, while a trio of Senators began negotiating a climate bill from scratch. As the clock wound down on the 111th Congress, it became less likely that climate legislation would be enacted, and more likely that EPA’s actions would be the principal U.S. response to climate issues for now.

Besides addressing climate change, EPA has taken action on a number of conventional air pollutants, generally in response to the courts. Several Bush Administration regulatory decisions were vacated or remanded to the agency: among them, the Clean Air Interstate Rule (CAIR)—a rule designed to control the long-range transport of sulfur dioxide and nitrogen oxides from power plants, by establishing a cap-and-trade program—and the Clean Air Mercury Rule, which would have established a cap-and-trade program for power plant mercury emissions. EPA will address these court decisions through new regulations—the agency proposed a replacement for CAIR July 6. Some in Congress have wanted to address these issues through legislation, an approach that might reduce the likelihood of further court challenges. The agency is also in the midst of reviewing ambient air quality standards for the six most widespread air pollutants. These standards serve as EPA’s definition of clean air, and drive a wide range of regulatory controls.

This report provides an overview of clean air legislative and regulatory issues. More detailed information on most of the issues can be found in other CRS reports, which are referenced throughout this report.

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Introduction

EPA regulatory actions to limit greenhouse gas (GHG) emissions using existing Clean Air Act authority have been the major focus of congressional interest in clean air issues in recent months. Members and Senators from both sides of the aisle have expressed concern that EPA is proceeding with regulations that could have major economic impacts without direct congressional authorization, and/or that EPA should delay taking such action until Congress specifically authorizes it.

The Administration counters that it would prefer for Congress to pass new legislation to control greenhouse gas emissions, but the Clean Air Act already requires action: a 2007 Supreme Court decision interpreting that authority found that EPA must weigh whether GHG emissions endanger public health and welfare and, if it concludes that they do, proceed with regulation.

The 111th Congress struggled to produce its own approach to climate change. On June 26, 2009, the House narrowly passed H.R. 2454, a 1,428-page bill addressing a number of interrelated energy and climate change issues. Among its numerous provisions, the bill would have established cap-and-trade programs for GHG emissions, beginning in 2012. The Senate did not act; however, two Senate committees reported bills,¹ but the prospect of obtaining 60 votes for either bill appeared slim, and neither came to the floor. Given these prospects, a trio of Senators began negotiating a climate bill from scratch, but they also encountered difficulty: the process ultimately lost its Republican sponsor and did not produce an introduced bill. Toward the end of the second session, there was talk of a slimmed-down bill focusing on energy and perhaps electric utilities, but even this limited approach did not come to the floor.

Besides legislation and potential EPA regulation of greenhouse gases, a bipartisan group of Senators and EPA both considered addressing issues related to sulfur dioxide (SO₂), nitrogen oxides (NO_x), and mercury emissions from electric power plants. Regulations addressing these emissions were vacated by the D.C. Circuit Court of Appeals in 2008, leaving major potential gaps in EPA and state regulations. EPA is developing new regulations to address the court's concerns and proposed regulations addressing SO₂ and NO_x, July 6, 2010, but legislation might provide a more straightforward solution, resolving ambiguities in current law and reducing the likelihood of further delays from litigation. S. 2995, a bipartisan bill addressing these issues, was introduced in the Senate and hearings were held, but no further action was taken.

The Obama Administration's EPA has also moved to reconsider or modify several Bush Administration decisions regarding national ambient air quality standards (NAAQS). NAAQS represent EPA's formal judgment regarding how clean the air must be to protect public health and welfare; the standards set in motion monitoring and planning requirements, which in turn lead to emission controls.

- On January 19, 2010, the agency proposed a more stringent NAAQS for ozone, having concluded that a 2008 revision to the standard did not satisfy the requirements of the Clean Air Act. The revision could affect as many as 650 counties—virtually every county that currently has an ozone monitor. Final action on this proposal is expected by the end of December.

¹ The Environment and Public Works Committee reported S. 1733, and the Energy and Natural Resources Committee reported S. 1462.

- On June 22, 2010, the agency promulgated revisions to the NAAQS for SO₂; 59 counties would violate the new SO₂ standard, based on the most recent monitoring data.² None violated the old standard.
- The agency is also reviewing or has recently completed reviews of the NAAQS for four other pollutants, notably particulates, which are emitted by a wide range of mobile and stationary sources. A revised particulate standard is to be proposed by February 2011. Early indications are that the agency may propose substantially more stringent standards.³

This report provides a brief overview of the climate change, power plant, and air quality standard issues. More detailed information on most of the issues can be found in other CRS reports, which are referenced throughout this report.

EPA's Greenhouse Gas Regulations

EPA's actions to regulate GHG emissions stem from more than a decade of petitions and litigation. Responding to a 1999 petition that it regulate greenhouse gases from new motor vehicles, the agency in 2003 denied that it had such authority, arguing that GHGs did not fall within the Clean Air Act's definition of "air pollutants." The denial was challenged by Massachusetts, 11 other states, and various other petitioners in a case that ultimately reached the Supreme Court. In an April 2, 2007, decision (*Massachusetts v. EPA*), the Court found by 5-4 that EPA does have authority to regulate greenhouse gas emissions, since the emissions are clearly air pollutants under the Clean Air Act's definition of that term.⁴ The Court's majority concluded that EPA must, therefore, decide whether emissions of these pollutants from new motor vehicles contribute to air pollution that may reasonably be anticipated to endanger public health or welfare. When it makes such an "endangerment finding," the act requires the agency to establish standards for emissions of the pollutants.

On December 15, 2009, acting in response to the Court's decision, EPA finalized an endangerment finding for greenhouse gas emissions from motor vehicles, under Section 202(a) of the act.⁵ Relying on this finding, EPA promulgated GHG emission standards for new cars and light trucks, April 1, 2010. The implementation of these standards will, in turn, trigger permitting requirements and the imposition of Best Available Control Technology for new major stationary

² The number of counties that will be formally designated nonattainment is likely to be different from the 59 EPA identified, for two reasons. First, EPA promulgated changes to the monitoring requirements along with the new standard. Second, the actual designations will most likely be made based on 2009-2011 monitoring data, whereas the 59 counties were identified using 2007-2009 data.

³ On July 2, 2010, EPA released the Second External Review Draft of its Policy Assessment for the Review of the Particulate Matter NAAQS. The draft represented EPA staff's recommendations to the Administrator. It outlined options for revising both the fine and coarse particulate standard, both of which would make the standards more stringent. The draft is available at http://www.epa.gov/ttn/naaqs/standards/pm/s_pm_2007_pa.html. Information on the status of all of the NAAQS revisions can be found below in the section of this report entitled "Air Quality Standards."

⁴ *Massachusetts v. EPA*, 549 U.S. 497 (2007). The majority held: "The Clean Air Act's sweeping definition of 'air pollutant' includes 'any air pollution agent or combination of such agents, including any physical, chemical ... substance or matter which is emitted into or otherwise enters the ambient air....' ... Carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons are without a doubt 'physical [and] chemical ... substances[s] which [are] emitted into ... the ambient air.' The statute is unambiguous."

⁵ 74 *Federal Register* 66496. While generally referred to as the "endangerment finding" (singular), the *Federal Register* notice consists of two separate findings: a Finding that Emissions of Greenhouse Gases Endanger Public Health and Welfare, and a Finding that Greenhouse Gases From Motor Vehicles Cause or Contribute to the Endangerment of Public Health and Welfare.

sources of GHGs beginning in 2011. (For information on these regulations and permit requirements, see CRS Report R40506, *Cars, Trucks, and Climate: EPA Regulation of Greenhouse Gases from Mobile Sources*, and CRS Report R41212, *EPA Regulation of Greenhouse Gases: Congressional Responses and Options*.)

The prospect of GHG standards for motor vehicles is not particularly controversial. On May 19, 2009, President Obama announced an agreement involving nine U.S. and foreign auto manufacturers; the federal government; the governors of California, Michigan, and Massachusetts; the United Auto Workers; and environmental groups under which EPA and the National Highway Traffic Safety Administration (NHTSA) would proceed with a joint rulemaking in which GHG emissions from new motor vehicles would be reduced under the Clean Air Act, while NHTSA would set corresponding fuel economy standards under the Corporate Average Fuel Economy (CAFE) program.⁶ The objective of the new greenhouse gas standards is to reach reduction levels similar to those adopted by the state of California and 13 other states, who will harmonize their standards with those of EPA as part of the agreement. The California standards required about a 30% reduction in GHG emissions from new vehicles by 2016. The auto industry supported the national agreement, in part, to avoid having to meet standards on a state-by-state basis; thus, it is not interested in seeing EPA's motor vehicle GHG standards blocked.

In addition to the motor vehicle GHG standards, EPA has received petitions asking the agency to regulate GHGs from a variety of other sources, including coal mines, concentrated animal feeding operations (CAFOs), aircraft, ocean-going ships, nonroad engines and equipment (e.g., construction equipment, farm equipment, recreational equipment, forklifts, harbor craft, and lawn and garden equipment), and fuels. Another petition asks the agency to set National Ambient Air Quality Standards for seven specific greenhouse gases. The agency also faces lawsuits seeking to force it to regulate GHGs from stationary sources, including power plants, petroleum refineries, nonroad vehicles and engines, and the Portland cement industry. The decision to move forward on GHG standards for new motor vehicles is seen by many as a precedent for regulation of these other sources.⁷

Even without EPA decisions on these petitions or the conclusion of lawsuits, the adoption of GHG standards for motor vehicles will trigger GHG permit requirements for new stationary sources, as a result of language in Section 165 of the act that requires such permits to require best available control technology for all pollutants "subject to regulation" under the act. It is this triggering of standards for stationary sources (power plants, manufacturing facilities, and others) that appears to have raised the most concern in Congress: legislation has been introduced in both the House and Senate aimed at preventing EPA from implementing these requirements. The legislation has taken several forms, including the introduction of resolutions of disapproval for the endangerment finding itself under the Congressional Review Act (S.J.Res. 26, H.J.Res. 66,

⁶ The President's announcement and related documents, including a Notice of Upcoming Joint Rulemaking to Establish Vehicle GHG Emissions and CAFE Standards, which appeared in the May 22, 2009 *Federal Register*, and both the draft and final emission standards can be found at <http://www.epa.gov/otaq/climate/regulations.htm>. For additional information, see CRS Report R40166, *Automobile and Light Truck Fuel Economy: The CAFE Standards*, by Brent D. Yacobucci and Robert Bamberger or CRS Report R40506, *Cars, Trucks, and Climate: EPA Regulation of Greenhouse Gases from Mobile Sources*, by James E. McCarthy.

⁷ For a further discussion of these issues, see CRS Report R40984, *Legal Consequences of EPA's Endangerment Finding for New Motor Vehicle Greenhouse Gas Emissions*, by Robert Meltz, CRS Report R40506, *Cars, Trucks, and Climate: EPA Regulation of Greenhouse Gases from Mobile Sources*, by James E. McCarthy, and CRS Report R40585, *Climate Change: Potential Regulation of Stationary Greenhouse Gas Sources Under the Clean Air Act*, by Larry Parker and James E. McCarthy.

H.J.Res. 76, and H.J.Res. 77), and five other bills that would either require EPA to reevaluate its endangerment finding (H.Res. 974), amend the Clean Air Act to provide that greenhouse gases are not subject to the act (H.R. 4396), limit EPA's GHG authority to motor vehicle emissions (S. 1622), or suspend EPA actions regulating stationary source emissions of GHGs for two years (S. 3072, H.R. 4753). S.J.Res. 26, Senator Murkowski's resolution of disapproval for the endangerment finding, was defeated 53-47, on June 10, 2010. Meanwhile, EPA has itself promulgated regulations and guidance that would delay the applicability of requirements for stationary sources of GHGs until 2011 and focus its initial regulatory efforts on the largest emitters, granting smaller sources at least a six-year reprieve.⁸

Although both the resolutions of disapproval and the stand-alone legislation to restrict EPA's authority have received a great deal of attention, the path to enactment of either of these forms of legislation would be a steep one. The Obama Administration has made the reduction of GHG emissions one of its major goals; as a result, many conclude that legislation restricting EPA's authority to act, if passed by Congress, would encounter a presidential veto.

Addressing the issue through an amendment to the EPA appropriation, by cutting EPA's appropriation or by restricting its authority to use funds to take specific GHG regulatory actions, might have more chance of enactment. The overall appropriation bill to which it would be attached would presumably contain other elements that would make it more difficult to veto. This approach was discussed at some length in the fall of 2009, when Senator Murkowski introduced (but ultimately did not offer) S.Amdt. 2530 to the Interior, Environment, and Related Agencies Appropriation Act (H.R. 2996).

In short, there are numerous ways that Congress can address EPA's greenhouse gas authority, and opponents of EPA action may continue to exert pressure to delay or limit the agency's actions, as the agency continues on its planned course. (For a more detailed discussion of EPA's regulatory actions and potential congressional responses, see CRS Report R41212, *EPA Regulation of Greenhouse Gases: Congressional Responses and Options*, by James E. McCarthy and Larry Parker.)

Legislation on Climate Change

On June 26, 2009, by a vote of 219-212, the House passed H.R. 2454, the American Clean Energy and Security Act of 2009. The bill, also referred to by its acronym (ACES) or as the Waxman-Markey bill, addresses a number of interrelated energy and climate change issues. The Senate Energy and Natural Resources Committee and the Senate Environment and Public Works Committee reported Senate counterparts: S. 1462 (Bingaman), equivalent to the energy titles, and S. 1733, the Kerry-Boxer bill, establishing a cap-and-trade system and other measures to address climate change. The Kerry-Boxer bill faced strong opposition, however. The Republican members of the Environment and Public Works Committee boycotted the markup. The bill was reported with no Republican support and less than unanimous support among Democrats: it was clear that the bill would lack the 60 votes necessary to overcome a filibuster and secure passage on the floor. As a result, negotiations took place among a trio of Senators (Kerry, Graham, and Lieberman) for a bipartisan (or, more accurately, tripartisan) alternative. This legislation, without

⁸ EPA has promulgated two rules that would have these effects: "Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule," final rule, 75 *Federal Register* 31514, June 3, 2010; and "Reconsideration of Interpretation of Regulations that Determine Pollutants Covered by Clean Air Act Permitting Programs," final rule, 75 *Federal Register* 17004, April 2, 2010.

Senator Graham's sponsorship, circulated extensively in draft form in 2010, but was not introduced.

Controlling greenhouse gas emissions was among the highest priorities of the congressional leadership and the Obama Administration in the 111th Congress. It would have been addressed in the ACES legislation in a number of ways, many of which would have amended the Clean Air Act. The remainder of the climate portion of this report discusses the House bill and the issues that arose in the course of its consideration, with occasional references to developments in the Senate.

The House bill would have amended the Clean Air Act to establish a cap-and-trade program⁹ (similar to the act's current program for addressing acid rain) to limit greenhouse gas (GHG) emissions beginning in 2012.¹⁰ The emissions cap on covered sources would have gradually declined—from 3% below the 2005 emissions level in 2012 to 83% below in 2050. In addition to the cap-and-trade program, the bill would have established renewable energy and energy efficiency requirements, mandated carbon capture and sequestration by new coal-fired electric generating units, and required EPA to set GHG emission standards for various sources. The bill distributed the cap-and-trade program's emission allowances to a wide array of sectors in an effort to address potential impacts on low income households and protect industries that might be subject to import competition from countries with less stringent GHG requirements, and it encouraged the use of "offsets" (emission reductions in sectors not directly covered by the cap-and-trade program). The cap-and-trade program in S. 1733 was similar.¹¹

Legislative and Regulatory Issues

In an earlier version of this report, we discussed five broad issues that climate legislation would need to address: (1) how a new program regulating greenhouse gas emissions would relate to the Clean Air Act, which gives EPA broad authority to set standards for air pollutants—potentially including GHGs; (2) whether legislation would focus on individual sectors of the economy, the economy as a whole, or both; (3) whether a cap-and-trade system would be the best approach, and, if it were chosen, the specifics of such a system:

- the comprehensiveness of the program,
- how allowances (which are essentially permits to emit GHGs) would be distributed or sold,
- how allowance price volatility might be addressed,
- what measures would be taken to address potential effects on U.S. industries vis-a-vis foreign competitors, and

⁹ A cap-and-trade system sets a declining national cap on emissions and allocates emission allowances that can be bought and sold on open markets. For additional information, CRS Report RL34513, *Climate Change: Current Issues and Policy Tools*, by Jane A. Leggett.

¹⁰ Seven greenhouse gases were listed in Section 711 of the bill: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and nitrogen trifluoride (NF₃). The EPA Administrator would have been given authority to designate additional gases. The bill also provided specific authority to promulgate regulations for black carbon emissions.

¹¹ For a summary and comparison of the House and Senate bills, see CRS Report R40896, *Climate Change: Comparison of the Cap-and-Trade Provisions in H.R. 2454 and S. 1733*, by Brent D. Yacobucci, Jonathan L. Ramseur, and Larry Parker.

- what role there might be for offsets (i.e., credit for emission reductions by sources outside the cap-and-trade program);

(4) what role there would be for carbon taxes; and (5) what role there would be for state programs—in particular, the degree to which a federal program might preempt state measures affecting similar sources.

The Waxman-Markey bill, as passed by the House, addressed most of these issues.¹² It would have both established an economy-wide cap-and-trade system and addressed individual sectors of the economy and categories of emitters. In addition to capping GHG emissions, it set forth energy efficiency and renewable energy requirements aimed at reducing the emissions of individual sectors, notably electric utilities, cars and trucks, electrical appliances, and commercial or government buildings. Together, these sectors account for the lion's share of energy use and GHG emissions. The bill would have amended the Clean Air Act to remove potential authority that EPA has to regulate GHGs under several broadly worded sections of the existing statute, while establishing new requirements that EPA set standards for specific emission sources. It would not have established a carbon tax. In general, it would not have preempted state authority to set standards for GHG emission sources, but it would have preempted state and regional cap-and-trade systems for the period 2012-2017.

S. 1733, reported by the Environment and Public Works Committee on February 2, 2010, had similar provisions. The following sections discuss these provisions in more detail, as well as issues that arose during floor debate on the House bill.¹³

Cap-and-Trade

The House bill would have added a new Title VII to the act, in which an economy-wide cap-and-trade program for GHGs would have been established. The cap for GHG emissions from major sources of emissions decreased 3% by 2012, 17% by 2020, 42% by 2030, and 83% by 2050, compared to 2005 levels. As the cap (and hence, the number of allowances) was gradually ratcheted down, markets would have determined who would reduce emissions: companies that could do so at low cost would have incentives to take action; companies with fewer or more costly options could buy allowances or offsets¹⁴ to cover excess emissions.

GHG Emission Standards

In addition to the cap-and-trade system, the bill also would have added a new Title VIII to the act, in which standards for specific sources of GHG emissions were addressed. Under Title VIII, EPA would have been required to

¹² For a detailed summary of the Waxman-Markey bill, see CRS Report R40643, *Greenhouse Gas Legislation: Summary and Analysis of H.R. 2454 as Passed by the House of Representatives*, coordinated by Mark Holt and Gene Whitney.

¹³ CRS has several reports summarizing or comparing the House and Senate bills, the broadest of which are CRS Report R40643, *Greenhouse Gas Legislation: Summary and Analysis of H.R. 2454 as Passed by the House of Representatives*, coordinated by Mark Holt and Gene Whitney, and CRS Report R40896, *Climate Change: Comparison of the Cap-and-Trade Provisions in H.R. 2454 and S. 1733*, by Brent D. Yacobucci, Jonathan L. Ramseur, and Larry Parker.

¹⁴ An offset is a measurable reduction, avoidance, or sequestration of GHG emissions from a source not covered by an emission reduction program. Examples might include planting trees on previously non-forested lands, capturing methane emissions from agricultural sources, or implementing an energy-efficiency project in a developing country that has no GHG reduction program.

- set performance standards for CO₂ removal from new coal-fired power plants—50% removal for units initially permitted after January 1, 2009, and 65% for units initially permitted after January 1, 2020. These standards would not have taken effect until 2025, or four years after EPA determined that carbon capture and sequestration technology had met criteria for commercialization specified in the bill, whichever is earlier;
- promulgate regulations within two years of enactment to minimize the risk of atmospheric release of CO₂ from geologic sequestration sites, and develop a certification and permitting process for such sites;
- promulgate GHG emission standards that reflect the greatest degree of emissions reduction achievable for new heavy duty motor vehicles and engines, by December 31, 2010;
- promulgate GHG emission standards that reflect the greatest degree of emissions reduction achievable for nonroad vehicles or engines, by December 31, 2012;
- set New Source Performance Standards and corresponding regulations for existing uncapped major sources of GHGs, generally within three years of the date of enactment; and
- report on black carbon emissions, including an inventory of sources and identification of cost-effective control technologies, and, within two years of enactment, either promulgate regulations to reduce emissions or find that existing Clean Air Act regulations provide adequate control.

HFC Cap-and-Trade

The bill would also have amended Title VI of the Clean Air Act to establish a separate cap-and-trade program for hydrofluorocarbons, refrigerants used in air conditioning systems, which, with one exception, have a global warming potential 1,000-15,000 times as great as CO₂. HFC production and imports would have been capped at 90% of baseline levels in 2012, and the cap would have declined each year until it reached 15% of the baseline in 2033. The baseline amount would have been the amount that EPA determined was the annual average consumed in the period 2004-2006, but not higher than 370 million tons of CO₂ equivalent, nor less than 280 million tons.

Removal of Existing EPA Authorities

Among the more controversial aspects of H.R. 2454 was its removal of numerous potential authorities under current law that the agency could use to control emissions of GHGs. Under the Obama Administration, the authority EPA already possesses has taken on new significance. The President is committed to addressing GHG emissions, and he can use existing Clean Air Act authority in a number of ways to do so. For starters, the agency proposed on April 17, 2009, and finalized December 15 an “endangerment finding” under Section 202(a) of the Clean Air Act. This finding permits EPA to establish GHG emission standards for motor vehicles. On May 19, 2009, before finalizing the endangerment finding, the President announced that EPA would move forward with the motor vehicle standards. EPA promulgated the standards April 1, 2010. Implementation of the first limits is scheduled for the 2012 model year. EPA also proposed GHG emission standards for medium- and heavy-duty trucks and engines, November 30, 2010.

In addition to the pending controls on cars and trucks, EPA has received nine additional petitions to regulate GHG emissions from coal mines, concentrated animal feeding operations (CAFOs), ships, non-road engines, aircraft, and fuels. Any of these petitions could prompt further agency

action. Another petition asks the agency to set National Ambient Air Quality Standards for seven specific greenhouse gases. The agency also faces lawsuits seeking to force it to regulate GHGs from stationary sources, including power plants, petroleum refineries, and the Portland cement industry. The decisions on motor vehicle standards are likely to serve as precedents for some of the other decisions, and may have implications for the agency's position in the pending litigation.

During the Bush Administration, some groups, including EPA, four Cabinet departments, and the Office of Management and Budget, expressed concern that proceeding with GHG standards for motor vehicles would activate numerous other Clean Air Act provisions.¹⁵ Addressing these concerns, H.R. 2454 would have prevented EPA from setting National Ambient Air Quality Standards for GHGs solely on the basis of their effect on global climate change. It would have prohibited the agency from regulating GHGs under Section 115's provisions for international air pollution. It would have prohibited regulation of GHGs as hazardous air pollutants under Section 112. It would have prohibited the use of New Source Review to regulate GHG emissions under the Prevention of Significant Deterioration (PSD) program. And no stationary source of GHGs would have been required to obtain a permit under Title V of the act solely because of its GHG emissions. Of these, only the two permit provisions (PSD-NSR, and Title V) have been invoked by EPA, thus far, and the agency has taken steps to limit their applicability.¹⁶ The other authorities seem, for the most part, ill-designed to address GHG emissions.¹⁷ Nevertheless, advocates of retaining the authorities questioned the necessity of their removal. (For a further discussion of these authorities, see CRS Report R40585, *Climate Change: Potential Regulation of Stationary Greenhouse Gas Sources Under the Clean Air Act*, and CRS Report R41212, *EPA Regulation of Greenhouse Gases: Congressional Responses and Options*.)

Agricultural Sources of Emissions

Another major controversy concerned the treatment of agricultural sources of emissions in the Waxman-Markey bill. The bill would have excluded the "agricultural and forestry sectors" (undefined in the bill) from its emissions cap. It would also have excluded sources of methane from enteric fermentation (livestock) from the standards that EPA must promulgate for uncapped emission sources. Instead, it would have treated agriculture and forestry activities as a source of offsets (reductions from sources outside the cap-and-trade system) that could be purchased by capped sources and used in place of allowances. The bill would have allowed the use of up to 1 billion offset credits from domestic sources annually.

Industrial and electric utility emitters subject to the GHG cap would presumably have purchased offsets if the cost of doing so were less than the cost of controlling their own emissions or of

¹⁵ See U.S. EPA, "Regulating Greenhouse Gas Emissions Under the Clean Air Act," Advance Notice of Proposed Rulemaking, 73 Federal Register 44354, July 30, 2008.

¹⁶ EPA shares congressional concerns about the potentially broad scope of the permit requirements, primarily because a literal reading of the act might require as many as 6 million stationary sources to obtain permits. Thus, on June 3, 2010, the agency promulgated a "Tailoring Rule" so that it can focus its resources on the largest emitters while deciding over a six-year period what to do about smaller sources. The Tailoring Rule is available at <http://www.epa.gov/nsr/actions.html#may10>. A separate guidance document, "Reconsideration of Interpretation of Regulations that Determine Pollutants Covered by Clean Air Act Permitting Programs," at 75 Federal Register 17004, April 2, 2010, delays the effective date of the permit requirements to January 2, 2011.

¹⁷ In general, for example, the act defines major emission sources as those that emit more than 100 or 250 tons per year of a pollutant: as noted above, this would include as many as 6 million sources in the case of CO₂, potentially overburdening EPA and state environmental agencies. Thus, the Clean Air Act's existing authority may be useful as a starting point, but most observers conclude that a new control program designed specifically to address GHGs would make more sense.

purchasing allowances. As a result, agriculture and forestry could have earned substantial sums for activities undertaken to reduce their GHG emissions—from \$3.7 billion to \$7.8 billion annually in gross revenues using an initial set of CBO assumptions.¹⁸ USDA’s Economic Research Service was less sanguine about the near-term revenues; nevertheless, its analysis “strongly suggests that revenue from agricultural offsets ... rise faster than costs to agriculture from cap and trade legislation.”¹⁹

The agriculture provisions helped insure some support for the bill from the agricultural community, but raised concerns among those who favored a more stringent bill. Of particular concern to the latter group was the bill’s delegation of authority over the offset program to the Department of Agriculture rather than to EPA.

International Offsets

The bill would also have allowed up to 1 billion offset credits to be generated annually by international sequestration or emission reduction activities. If fewer than 1 billion domestic offsets were used, up to 500 million additional international offsets could have been substituted, raising the total permissible international offsets to as many as 1.5 billion in any given year. The objective of this provision was to provide emission reductions at a lower cost than domestic GHG controls and reduce emissions from developing countries.²⁰ Opponents of the provision, however, viewed it as a give-away to countries that choose not to participate in internationally agreed reduction requirements.

Tariff Provisions

For more than a decade, a primary concern in the climate debate has been how a GHG emissions cap or other GHG controls would affect the competitiveness of U.S. industry: whether, for example, it might lead manufacturers of carbon-intensive goods to relocate production to countries with weaker GHG regulations or no cap at all. A number of options have been proposed to address this “carbon leakage” concern, including directly supporting domestic carbon-intensive industries, imposing countervailing duties or allowance requirements on imports from countries with weaker GHG requirements, and/or developing sectoral approaches that address the emissions of specific industries worldwide.²¹

¹⁸ In its June 5 cost estimate for H.R. 2454 as ordered reported, the Congressional Budget Office estimated that allowance prices would range from \$16 per ton in 2012 to \$26 per ton in 2019. Based on EPA data on the available supply of domestic offsets at different prices, CBO estimated that covered entities would use domestic offsets to substitute for about 230 million allowances in 2012 and about 300 million allowances in 2020. Under these assumptions, the value of offset credits to the agricultural and forestry sectors would range from \$3.68 billion in 2012 to as much as \$7.8 billion in 2020. See Congressional Budget Office Cost Estimate, “H.R. 2454, American Clean Energy and Security Act of 2009, as ordered reported by the House Committee on Energy and Commerce on May 21, 2009,” June 5, 2009, at <http://www.cbo.gov/ftpdocs/102xx/doc10262/hr2454.pdf>. EPA estimates were lower: the agency’s modeling projected domestic offset revenues at \$2.3 billion in 2015 and \$3.0 billion in 2020. Offset providers would, of course, incur costs to undertake the activities that generate the offsets, so net revenues would be lower than these estimates in each case.

¹⁹ Office of the Chief Economist, Economic Research Service, U.S. Department of Agriculture, “A Preliminary Analysis of the Effects of H.R. 2454 on U.S. Agriculture,” July 22, 2009, p. 11.

²⁰ Many of the least cost GHG reduction options may be in developing countries, but verification of the baseline emissions and of the continued application of emission controls could pose challenges to the regulatory authority in such cases. For a discussion of offsets, see CRS Report RL34436, *The Role of Offsets in a Greenhouse Gas Emissions Cap-and-Trade Program: Potential Benefits and Concerns*, by Jonathan L. Ramseur.

²¹ For a discussion, see CRS Report R40100, *“Carbon Leakage” and Trade: Issues and Approaches*, by Larry Parker and John Blodgett.

H.R. 2454 would have established an allowance rebate program for energy-intensive, trade-exposed industries. The net effect of the program would have been that these industries (likely to include iron and steel, aluminum, and other energy-intensive heavy industry) would have been given free allowances until 2025. Starting then, the rebates would have been phased out over a 10-year period.

EPA, with the concurrence of U.S. Customs, would also have been required to establish international reserve allowance requirements (tariff provisions) for imports of energy-intensive trade-exposed goods from countries that have not entered into international agreements for GHG emission reductions at least as stringent as those of the United States. This provision, which would have begun in 2020, was singled out by the President after the bill's passage as an area of concern. Earlier versions of the bill would have given the President tariff authority, but would have allowed him greater discretion not to impose the tariffs.

State Preemption

A number of states, notably California and the Northeastern states, have already begun programs to reduce GHG emissions. (For a discussion, see CRS Report RL33812, *Climate Change: Action by States to Address Greenhouse Gas Emissions*.) Although the federal government under the Bush Administration challenged some of these programs, particularly those affecting mobile sources, states do have clear authority to regulate emissions from power plants, landfills, residential and commercial buildings, and other stationary sources of GHGs. The extent to which such state programs might serve as national models (or that a patchwork of state programs might serve as a catalyst to a stronger federal regime) has been one set of issues; another is the degree to which a federal program might preempt state measures affecting similar sources.

The Waxman-Markey bill would generally have left the states' authority to set standards for stationary sources of GHGs intact. One exception would have been that state and regional cap-and-trade programs for GHGs would have been preempted from 2012 through 2017. The bill also would have preserved EPA's authority to grant waivers to California for mobile source GHG standards.

Cost of the Bill

Among the most important issues in the House debate was the prospective cost of the bill. In an earlier CRS report, CRS noted that long-term cost projections, particularly for a bill that would reduce GHG emissions over the course of four decades, are at best speculative.²² Over such a long period of time, uncertainty about the future direction of the basic drivers of greenhouse gas emissions and the economy's responsiveness (economically, technologically, and behaviorally) make economic models unable to predict the ultimate macroeconomic costs of a GHG reduction program.

Despite this and similar caveats offered by other analysts, estimates of the bill's impact were widely cited both by opponents and proponents in the House debate. Opponents of the bill claimed that it would impose costs of as much as \$3,100 annually per family, one source of which was a 2007 assessment of U.S. cap-and-trade proposals prepared by MIT's Joint Program on the Science and Policy of Global Change. The author of that study, in letters to the House minority

²² CRS Report RL34489, *Climate Change: Costs and Benefits of S. 2191/S. 3036*, by Larry Parker and Brent D. Yacobucci. A report addressing the costs of H.R. 2454 (CRS Report R40809, *Climate Change: Costs and Benefits of the Cap-and-Trade Provisions of H.R. 2454*, by Larry Parker and Brent D. Yacobucci) reaches similar conclusions, while analyzing the results of seven studies that have modeled the costs of H.R. 2454.

leader and the Select Committee on Energy Independence and Global Warming, stated that the study's conclusions had been misstated.²³

At the other end of the spectrum, EPA estimated that the costs of the reported bill (prior to some of the final changes) would be \$80 to \$111 per family, annually,²⁴ or as proponents have sometimes expressed it, less than the cost of a postage stamp a day. EPA's lower cost was, in part, the result of assuming cost-saving energy technologies and including the availability of low-cost emission offsets from both domestic and international sources. As noted above, the House bill would have allowed the use of as many as 2 billion offsets annually (out of a total allowance pool of 5-6 billion in the initial years). Questions have been raised whether so many offsets would actually be available, especially in the short term.²⁵

A related issue was the impact of the bill on the federal deficit. In a letter dated June 26, 2009, the Congressional Budget Office and the Joint Committee on Taxation (JCT) estimated that

enacting the legislation would increase revenues by \$873 billion over the 2010-2019 period and would increase direct spending by \$864 billion over that 10-year period. In total, CBO and JCT estimate that enacting the legislation would reduce future budget deficits by about \$4 billion over the 2010-2014 period and by about \$9 billion over the 2010-2019 period.²⁶

Whatever the true cost, a bill of this size, affecting numerous sectors of the economy, would be bound to create winners and losers, even if its net impact on the economy or on federal revenues were small. The result was intense lobbying, as affected industries/states/regions/labor unions/etc. attempted to shape the bill to their advantage.

Experience with Other Cap-and-Trade Systems

Although now disparaged by opponents of climate legislation, cap-and-trade programs have had an enviable reputation over most of the last two decades, largely based on the success of the Clean Air Act's acid rain program. That program imposed a cap on sulfur dioxide emissions for a limited number of electric power plants in 1995, and in 2000 lowered the cap and expanded coverage to more plants. It met its emission reduction goals at low cost, with virtually 100% compliance, and with minimal administrative oversight.

The success of the program was at least partly the result of the favorable circumstances in which it was implemented: the reduction targets were easily met because of an abundant supply of cheap low-sulfur coal; there were only about 1,000 entities (power plants) covered by the trading program, making it simple and inexpensive to monitor and administer; and most of the regulated

²³ In an April 1, 2009 letter, John Reilly, Associate Director of the MIT program, stated that the \$3,100 estimate "... is nearly 10 times the correct estimate which is approximately \$340." The \$3,100 figure was widely quoted, including during House debate on H.R. 2454, June 26. The letters stating that the cost data were being misrepresented appeared at <http://www.talkingpointsmemo.com/documents/2009/04/mit-scientist-republicans-confused-about-my-climate-change-study.php?page=1>.

²⁴ U.S. EPA, Office of Atmospheric Programs, *EPA Analysis of the American Clean Energy and Security Act of 2009, H.R. 2454, in the 111th Congress*, June 23, 2009, at http://energycommerce.house.gov/Press_111/20090623/hr2454_epaanalysis2.pdf.

²⁵ For example, see "How Realistic Are Expectations for the Role of Greenhouse Gas Offsets in U.S. Climate Policy?" World Resources Institute Working Paper, March 2009, at http://pdf.wri.org/working_papers/greenhouse_gas_offsets_in_us_climate_policy_phase1.pdf.

²⁶ Letter of Douglas W. Elmendorf, Director, CBO, to Hon. Henry A. Waxman, Chairman, Committee on Energy and Commerce, June 26, 2009, p. 1.

entities were allowed 10 years to achieve compliance, by which time early reductions had generated an enormous number of extra allowances that helped lubricate the trading system.

Some other trading programs have not been as successful. Southern California's Regional Clean Air Incentives Market (RECLAIM), for example, which was implemented in 1994 to reduce emissions of NO_x and SO₂ in the Los Angeles area, saw a 50-fold increase in NO_x allowance prices during the 2000-2001 California energy crisis. To permit its continued functioning and allow utilities to use backup power generators, electric utilities were removed from the RECLAIM system, charged a flat fee of \$15,000 per ton for excess emissions, and subjected to new command and control requirements (i.e., the type of regulation the trading system was designed to avoid). The European GHG trading system (EU-ETS), established to help European Union countries meet their Kyoto Protocol targets, saw wild swings in short-term allowance prices during its start-up years, making planning and decision-making difficult for participating entities.²⁷

Both supporters and opponents have cited previous experience with cap-and-trade systems to buttress their arguments, and the House bill's GHG cap-and-trade system was designed to deal with several of the problems experienced by previous systems. Among the most notable of the design features were mechanisms to address potential volatility of allowance prices. The bill addressed cost control through five main mechanisms: (1) unlimited banking and limited borrowing of allowances, (2) a two-year compliance period, (3) a strategic auction with a reserve price to increase the availability of allowances in the early years of the program, (4) periodic auctions with a reserve price, and (5) generous limits on the use of offsets.²⁸

Emissions from Power Plants

In addition to climate change, other clean air issues with a shorter time horizon are being addressed by EPA. Many of these have to do with emissions from electric power plants.

Coal-fired power plants are among the largest sources of air pollution in the United States. Under the Clean Air Act, however, they are not necessarily subject to stringent requirements: emissions and the required control equipment can vary depending on the location of the plant, when it was constructed, whether it has undergone major modifications, the specific type of fuel it burns, and, to some extent, the vagaries of EPA enforcement policies. More than half a dozen separate Clean Air Act programs could potentially be used to control emissions, which makes compliance strategy complicated for utilities and difficult for regulators. Because the cost of the most stringent available controls, for the entire industry, could range into the tens of billions of dollars, utilities have fought hard and rather successfully to limit or delay regulations affecting them, particularly with respect to plants constructed before the Clean Air Act of 1970 was passed.

As a result, emissions from power plants have not been reduced as much as those from some other sources. Many plants built in the 1950s and 1960s (generally referred to as "grandfathered" plants) have little emission control equipment.

Collectively, power plants are large sources of pollution. In 2005, they accounted for 10.2 million tons of sulfur dioxide (SO₂) emissions (70% of the U.S. total), 52 tons of mercury emissions (46% of the U.S. total), and 3.6 million tons of nitrogen oxides (19% of the U.S. total). Power

²⁷ For additional information on the EU trading system, see CRS Report RL34150, *Climate Change and the EU Emissions Trading Scheme (ETS): Kyoto and Beyond*, by Larry Parker.

²⁸ For more information, see CRS Report R40643, *Greenhouse Gas Legislation: Summary and Analysis of H.R. 2454 as Passed by the House of Representatives*, coordinated by Mark Holt and Gene Whitney.

plants are also considered major sources of fine particles (PM_{2.5}), many of which form in the atmosphere from emissions from a wide range of stationary and mobile sources. In addition, power plants account for about 40% of U.S. anthropogenic emissions of the greenhouse gas carbon dioxide.

With new ambient air quality standards for ozone, fine particles, and SO₂ taking effect, emissions of NO_x and SO₂ will necessarily have to be reduced to meet standards.²⁹ (These standards are discussed below under “Air Quality Standards.”) For more than a decade, mercury emissions have also been a focus of concern: 48 states have issued fish consumption advisories due to mercury pollution, covering 14 million acres of lakes, 882,000 river miles, and the coastal waters of 13 entire states. The continuing controversy over the interpretation of New Source Review requirements for existing power plants (also discussed below) has exerted pressure for a more predictable regulatory structure, as well.

Thus, some in industry, environmental groups, Congress, and the last two Administrations have said that legislation addressing power plant pollution in a comprehensive (multi-pollutant) fashion would be desirable. Such legislation would address the major pollutants on a coordinated schedule and would rely, to a large extent, on a system such as the one used in the acid rain program, where national or regional caps on emissions are implemented through a system of tradable allowances. The key questions have been how stringent the caps should be and whether carbon dioxide (CO₂), the major gas of concern with regard to climate change, would be among the emissions subject to a cap.

Clean Air Interstate Rule (CAIR)

The Senate Environment and Public Works Committee has voted twice on a multi-pollutant bill (in 2002 and 2005), but neither of the bills progressed to the Senate floor. In the House, similar bills have been introduced, but none has progressed to markup. On March 10, 2005, therefore, EPA announced that it would use existing Clean Air Act authority to promulgate final regulations similar to the Bush Administration’s multi-pollutant bill (the “Clear Skies” bill³⁰) for utility emissions of SO₂ and NO_x in 28 eastern states and the District of Columbia.³¹

The Clean Air Interstate Rule (CAIR) established cap-and-trade provisions for SO₂ and NO_x.³² CAIR covered only the eastern half of the country, but since most of the grandfathered generation capacity is located in the East and South, EPA projected that nationwide emissions of SO₂ would decline 53% by 2015 and NO_x emissions 56%.³³ The agency also projected that the rule would result in \$85-\$100 billion in health benefits annually by 2015, including the annual prevention of

²⁹ NO_x contributes to the formation of ozone and fine particles; SO₂, besides being a regulated pollutant in its own right, is also among the sources of fine particles.

³⁰ President Bush first proposed the Clear Skies Act on February 14, 2002, and the bill was introduced by request in the 107th Congress as H.R. 5266/S. 2815. In the 109th Congress, a somewhat modified Clear Skies bill, introduced as S. 131, was considered by the Environment and Public Works Committee, but failed to advance, on a 9-9 vote. Clear Skies was not introduced in the 110th Congress.

³¹ The rule appeared in the *Federal Register* two months later. See U.S. EPA, “Ambient air quality standards, national—Fine particulate matter and ozone; interstate transport control measures,” 70 *Federal Register* 25162, May 12, 2005.

³² A separate regulation, the Clean Air Mercury Rule (CAMR), promulgated at the same time, established a Clear-Skies-like cap-and-trade system for mercury emissions. It is described in a separate section below.

³³ As compared to nationwide emissions from electric generating units in 2001. Some of the projected reduction would be due to pre-existing regulations. See U.S. EPA, Office of Air and Radiation, *Regulatory Impact Analysis for the Final Clean Air Interstate Rule*, March 2005, pp. 3-3 and 3-4, at <http://www.epa.gov/cair/pdfs/finaltech08.pdf>.

17,000 premature deaths. CAIR's health and environmental benefits would be more than 25 times greater than its costs, according to EPA.

North Carolina v. EPA

CAIR was one of the few Bush Administration environmental initiatives that was generally supported by environmentalists. It also had broad support among the regulated community. But a variety of petitioners, including the state of North Carolina, which argued that the rule was not strong enough to address pollution from upwind sources, and some individual utilities that felt they were unfairly treated by the rule's emission budgets, challenged the rule in the D.C. Circuit, and the court vacated it July 11, 2008. A unanimous court found that EPA had established a significant contribution made by power plants to nonattainment of standards and failure to maintain standards in downwind states, as required by Section 110 of the Clean Air Act, but the court concluded that the agency's methodology for establishing emission budgets for each state was unrelated to that link.³⁴ The court also found that the choice of 2015 for a second phase compliance deadline, based on technological and economic feasibility, ignored EPA's statutory mandate. It found the fuel adjustment factors in the rule (which set more stringent requirements for natural gas- and oil-fired plants than for coal-fired ones) to be arbitrary and capricious. It concluded: "CAIR's flaws are deep. No amount of tinkering ... will transform CAIR, as written, into an acceptable rule."³⁵

Despite the seemingly high hurdle set by the language the court used, EPA, environmental groups, and the utility and mining industries asked the court to review its decision. On December 23, 2008, the court modified its decision, allowing CAIR to remain in effect until a new rule is promulgated by EPA.³⁶ The court was not specific about how long this process would be allowed to take, but stated:

Though we do not impose a particular schedule by which EPA must alter CAIR, we remind EPA that we do not intend to grant an indefinite stay of the effectiveness of this court's decision. Our opinion revealed CAIR's fundamental flaws, which EPA must still remedy.³⁷

Effects of the Decision

From a policy standpoint, the court's vacatur of CAIR would remove the lynchpin of the Bush Administration's approach to clean air. CAIR was a principal means by which EPA projected that nonattainment areas in the eastern half of the country would attain the ozone and fine particulate National Ambient Air Quality Standards (NAAQS); in the agency's analysis, it would also have been responsible for achieving the lion's share of reductions in mercury emissions from coal-fired power plants (as discussed further below); it would have addressed regional haze impacts from power plants; and it would have addressed state petitions to control upwind sources of ozone and fine particulate pollution, making controls on individual power plants under Section 126 of the Clean Air Act unnecessary, according to EPA. Thus, EPA asked the court to reconsider its decision, which led the court to announce that it would delay issuing its mandate.

There is general agreement among the states, electric utilities, and environmental groups that something like CAIR should be salvaged.

³⁴ North Carolina v. EPA, 531 F.3d 896 (D.C. Cir. 2008).

³⁵ Id. at 930.

³⁶ North Carolina v. EPA, 2008 Westlaw 5335481 (D.C. Cir. Dec. 23, 2008).

³⁷ Id. at *1.

- Without CAIR, most eastern states would have huge gaps in their emission control programs, which would have to be filled by other regulatory measures if the states are to attain the NAAQS by the statutory deadlines. The states could be subject to sanctions, including a suspension of federal highway funding for new projects, if they fail to adopt such measures.
- For the utilities, CAIR was designed to build on the existing regulatory framework of cap-and-trade programs under the acid rain program and the “NOx SIP Call.”³⁸ Anticipating the ability to bank and trade emission allowances under CAIR, numerous utilities have already invested in equipment to meet or exceed CAIR’s requirements, the first phase of which are now being implemented.
- For environmental groups, which found little to their liking in the Bush Administration, CAIR was the major exception. They argued for a stronger version of CAIR—particularly its second phase, to be implemented in 2015—but they generally supported the basic approach.

EPA’s CAIR Replacement: The Clean Air Transport Rule

On July 6, 2010, EPA proposed a replacement for CAIR, the Clean Air Transport Rule.³⁹ The transport rule would leave the CAIR Phase 1 limits in place and would set new limits replacing CAIR’s second phase in 2012 and 2014, up to three years earlier than CAIR would have.

The CAIR Phase 1 rules already appear to be having substantial effects. On August 11, 2010, EPA reported that emissions of SO₂ had declined sharply in both 2008 and 2009: in the latter year, emissions from fossil-fueled power plants in the lower 48 states (at 5.7 million tons) were 44% below 2005 levels. NOx emissions from the same sources declined to 1.8 million tons in 2009, a decline of 45% compared to 2005.⁴⁰ Further reductions of both SO₂ and NOx can be expected as Phase 1 takes effect.

The proposed transport rule would build on these reductions. It would establish a second and third phase of reductions in 2012 and 2014, with particular emphasis on SO₂—emissions of which would decline to 3.8 million tons (62% below 2005 levels) in 2014. The proposed rule would cover 31 Eastern, Midwestern, and Southern states and the District of Columbia, adding three new states (Oklahoma, Kansas, and Nebraska) to the 28 covered by CAIR. The rule would allow unlimited trading of allowances within individual states, but it would limit interstate trading in order to comply with the D.C. Circuit’s ruling. In order to insure that the rule is implemented quickly, EPA proposed a Federal Implementation Plan (FIP) for each of the states: the FIP specifies budgets for each state based on controlling emissions from electric power plants. States may develop their own State Implementation Plans and choose to control other types of sources if they wish, but the federal plan will take effect unless the state acts.

EPA estimates that the rule will cost the power sector \$2.8 billion annually in 2014, but it expects the benefits to be 40 to 100 times as great—an estimated \$120 billion to \$290 billion annually. The most important benefit would be 14,000 to 36,000 fewer premature deaths annually. Avoided

³⁸ The acid rain program is described above on p. 11. The NOx SIP Call, implemented in 2004, is a cap-and-trade program for control of nitrogen oxide emissions in the eastern half of the country.

³⁹ The proposal appeared in the *Federal Register* August 2, 2010. The rule, a Fact Sheet, a Regulatory Impact Analysis, and an overview presentation can be found on EPA’s website at <http://www.epa.gov/airtransport/actions.html#jul10>.

⁴⁰ Data are from EPA’s “2009 Acid Rain Program Emission and Compliance Data Report,” August 11, 2010, at <http://www.epa.gov/airmarkets/progress/ARP09.html>.

deaths and other benefits occur throughout the East, Midwest, and South, according to EPA, with Ohio, Pennsylvania, and New York benefitting the most.⁴¹

Because the agency is near finalizing more stringent ambient air quality standards for ozone, it stated its intention to propose another transport rule in 2011 to address any additional emission reductions needed to meet those new standards. It also stated an “ongoing commitment” to consider upwind contributions of pollution to nonattainment when implementing any future NAAQS revisions. With revisions of the fine particulate (PM_{2.5}) standard expected in 2011, additional transport rules might be expected.

State air pollution control agencies, through the National Association of Clean Air Agencies (NACAA), have argued that substantial further reductions will be necessary if the states are to attain the new ozone standards. Ozone forms through chemical reactions in the atmosphere between volatile organic compounds and NO_x; thus, NO_x reductions are key to attaining a more stringent ozone standard. For NO_x, the Phase 1 cap is 45% below baseline, with Phase 2 providing an additional 7%. The technology is clearly available to do more: EPA modeling projects 34% of coal-fired electric generating units in the transport region to be without the best available NO_x control in 2014.⁴² Assuming that modeling shows that more reductions are needed for the states to attain the new ozone NAAQS, the pressure will be on EPA to strengthen the regulations further.

Judicial and Legislative Options

The courts might be the venue for further consideration of the issues if any of the parties find themselves unhappy with the pace or substance of EPA’s regulatory decisions.

Congress might also act: in order to shorten the regulatory process and avoid further litigation, some have argued that Congress needs to resolve the issues posed by the D.C. Circuit’s 2008 CAIR decision. Over the past decade, several dozen multi-pollutant bills would have addressed SO₂ and NO_x emissions from power plants through a cap-and-trade system, most of them in conjunction with controls on mercury and CO₂. If legislation is to be considered now, the issues might, therefore, include not only the stringency and timing of SO₂ and NO_x controls, but also whether to include mercury and CO₂ controls in the bill.

On February 4, 2010, Senators Carper and Alexander, with a bipartisan group of cosponsors, introduced S. 2995 to address the issues posed by the CAIR decision and to set standards for power plant mercury emissions. The bill would establish cap-and-trade systems for SO₂ and NO_x with more stringent caps than those of the CAIR rule or EPA’s proposed replacement. The SO₂ cap would be 78% below the 2001 baseline in 2015, and 83% below in 2018. The EPA Administrator would be authorized to reduce the cap further for 2021 and later years. The NO_x cap would also be more stringent than provided by CAIR or the proposed transport rule and it would cover 32 states (seven more than CAIR, four more than the proposed EPA rule). In 2012, its cap would be 24% below CAIR’s emissions level (in addition to covering more states within that cap). In 2015, its cap would be identical to CAIR’s, but because it would cover seven more

⁴¹ U.S. EPA, Office of Air and Radiation, “Proposed Air Pollution Transport Rule,” Overview Presentation, July 26, 2010, pp. 13-15, at http://www.epa.gov/airtransport/pdfs/TRPresentationfinal_7-26_webversion.pdf.

⁴² U.S. EPA, Office of Air and Radiation, *Regulatory Impact Analysis for the Proposed Federal Transport Rule*, June 2010, Table 7-11, p. 259, http://www.epa.gov/ttn/ecas/regdata/RIAs/proposaltrria_final.pdf. The technology referred to is selective catalytic reduction (SCR).

states, would still be substantially more stringent. The bill would also establish a NO_x cap in the rest of the lower 48 states for the first time, which would decline 37% by 2020.

At a Senate hearing, March 4, 2010, there was general support for S. 2995, although some concern was expressed that the reductions would still not be sufficient to bring Eastern states into attainment of the ozone NAAQS.⁴³

Clean Air Mercury Rule (CAMR)

Background

Regulation of mercury emissions from coal-fired power plants has a complicated legislative and regulatory history, dating back to the 1990 Clean Air Act Amendments. EPA was required by that legislation and a 1998 consent agreement to determine whether regulation of mercury from power plants under Section 112 of the Clean Air Act was appropriate and necessary. Section 112 is the section that regulates emissions of hazardous air pollutants. In general, it requires EPA to set standards based on the Maximum Achievable Control Technology (a term defined with great precision in the act), and to impose the MACT standards at each individual emissions source. In a December 2000 regulatory finding, EPA concluded that regulation of mercury from power plants under Section 112 was appropriate and necessary. The finding added coal- and oil-fired electric generating units to the list of sources of hazardous air pollutants, and triggered other provisions of the 1998 consent agreement: that the agency propose MACT standards for them by December 15, 2003, and finalize the standards by March 15, 2005.

Rather than promulgate MACT standards, however, EPA reversed its December 2000 finding in March 2005, and established through regulations a national cap-and-trade system for power plant emissions of mercury, the Clean Air Mercury Rule (CAMR). Under CAMR, the final cap would have been 15 tons of emissions nationwide in 2018 (about a 70% reduction from 1999 levels, when achieved). There would also have been an intermediate cap of 38 tons in 2010, well above EPA's projection of emissions in that year.⁴⁴

Under the cap-and-trade system, utilities could either control the pollutant directly or purchase excess allowances from other plants that instituted controls more stringently or sooner than required. As with the acid rain and CAIR cap-and-trade programs, early reductions under CAMR could have been banked for later use, which the agency itself said would result in utilities delaying compliance with the full 70% reduction until well beyond 2018, as they used up banked allowances rather than installing further controls. The agency's analysis projected actual emissions to be 24.3 tons (less than a 50% reduction) as late as 2020. Full compliance with the 70% reduction would have been delayed until after 2025.⁴⁵ (For additional information on the mercury rule, see CRS Report RL32868, *Mercury Emissions from Electric Power Plants: An Analysis of EPA's Cap-and-Trade Regulations*, by James E. McCarthy.)

⁴³ "Legislative Hearing: S. 2995, The Clean Air Act Amendments of 2010," U.S. Senate Committee on Environment and Public Works, March 4, 2010. See especially the testimony of Colin P. O'Mara, Secretary, Delaware Department of Natural Resources and Environmental Control.

⁴⁴ The agency projected emissions at 31 tons in 2010 even if 99% of the generating units installed no mercury control equipment.

⁴⁵ U.S. EPA, Mercury RIA, previously cited, Table 7-3, p. 7-5.

New Jersey v. EPA

The CAMR rule was immediately challenged in petitions for review filed by New Jersey and 16 other states as well as other petitioners.⁴⁶ The D.C. Circuit, in a 3-0 decision handed down February 8, 2008,⁴⁷ vacated the rule. The court found that once the agency had listed electric generating units (EGUs) as a source of hazardous air pollutants, it had to proceed with MACT regulations under Section 112 of the act unless it “delisted” the source category, under procedures the act sets forth in Section 112(c)(9). Delisting would have required the agency to find that no EGU’s emissions exceeded a level adequate to protect public health with an ample margin of safety, and that no adverse environmental effect would result from any source—a difficult test to meet, given the agency’s estimate that EGUs are responsible for 46% of mercury emissions from all U.S. sources. Rather than delist the EGU source category, the agency had maintained that it could simply reverse its December 2000 “appropriate and necessary” finding, a decision that was much simpler because there were no statutory criteria to meet. The court found this approach unlawful. “This explanation deploys the logic of the Queen of Hearts, substituting EPA’s desires for the plain text of Section 112(c)(9),” the court said in its opinion.⁴⁸

Other Mercury Issues

Besides the question of whether EPA complied with the law’s requirements, critics found other reasons to oppose EPA’s cap-and-trade approach to controlling mercury. One of the main criticisms has been that it would not address “hot spots,” areas where mercury emissions and/or concentrations in water bodies are greater than elsewhere. In fact, under a cap-and-trade system, nothing would prevent emissions from increasing at hot spots. Many also argued that the mercury regulations should have been more stringent or implemented more quickly than the cap-and-trade regulations would have required. These arguments found a receptive audience in the states: about 20 states have promulgated requirements stricter than the federal program, with several requiring 80% to 90% mercury reductions before 2010. (For additional information, see archived CRS Report RL33535, *Mercury Emissions from Electric Power Plants: States Are Setting Stricter Limits*, by James E. McCarthy.)

Next Steps

Under the D.C. Circuit’s ruling, unless EPA delists the power plant category, it does not have the legislative authority to establish a cap-and-trade program for their mercury emissions: it must impose MACT standards on each individual plant once it has listed the category. The agency could have appealed the court’s ruling: under the Bush Administration, on October 17, 2008, it petitioned for certiorari to the Supreme Court.⁴⁹ But the Obama Administration withdrew the petition in early February 2009 and announced that it will proceed with the development of MACT standards.⁵⁰ Proposed standards are expected, under a consent agreement, by March 2011, with final standards to be promulgated in November of that year.

⁴⁶ Seven other states joined EPA in defending the rule.

⁴⁷ *New Jersey v. EPA*, 517 F.3d 574 (D.C. Cir. 2008).

⁴⁸ *Id.* at 582.

⁴⁹ 77 U.S.LW 3253 (No. 08-512).

⁵⁰ Withdrawal of EPA’s petition for certiorari left a separate petition filed by the Utility Air Regulatory Group before the Court. The Court denied that petition, February 23, 2009.

While the agency develops new regulations in response to the court's remand, new coal-fired electric generating units and modifications of existing units will be required to obtain permits under a provision of the law known as the "MACT hammer" (Section 112(g)(2)). Under this provision, if no applicable emission limits have been established, no person may construct a new major source or modify an existing major source in the category unless the Administrator or the state determine on a case-by-case basis that they meet MACT emission limits. On February 28, 2008, the Natural Resources Defense Council (NRDC) released a list of 32 new coal-fired power plants in 13 states that it believed must adopt MACT mercury controls under this provision.⁵¹

New Source Review

A related issue that has driven some of the debate over the regulation of power plant emissions is whether EPA has adequately enforced existing regulations, using a process called New Source Review (NSR). The New Source Review debate has occurred largely in the courts. EPA took a more aggressive stance on NSR late in the Clinton Administration, filing lawsuits against 13 utilities for violations at 51 plants in 13 states. The Bush and Obama Administrations have taken action against an additional dozen or so utilities and, after years of negotiation, settled many of the original suits.⁵² In the interim, however, the Bush Administration proposed major changes in the NSR regulations that critics argued would have weakened or eliminated New Source Review as it pertained to modifications of existing plants. Under the Obama Administration, some additional NSR cases have been filed against electric utilities, and six cases have been settled.

The controversy over the NSR process stems from EPA's use of it to require the installation of best available pollution controls on existing stationary sources of air pollution that have been modified. The Clean Air Act requires that plants undergoing modifications meet these NSR requirements, but industry has often avoided the NSR process by claiming that changes to existing sources were "routine maintenance" rather than modifications. In the 1990s, EPA began reviewing records of electric utilities, petroleum refineries, and other industries to determine whether the changes were, in fact, routine. As a result of these reviews, since late 1999, EPA and the Department of Justice have filed suit or administrative actions against numerous large sources of pollution, alleging that they made major modifications to their plants, extending plant life and increasing output, without undergoing required New Source Reviews and without installing best available pollution controls.

Of the utilities charged with NSR violations, 21 have settled with the EPA, generally without going to trial. Under the settlements, they have agreed to spend about \$10 billion on pollution controls or fuel switching to reduce emissions at their affected units. Combined, these companies will reduce pollution by at least 1.65 million tons annually.⁵³ Since March 2000, the agency has also reached 24 agreements with petroleum refiners representing 88% of industry capacity. The refiners agreed to settle potential charges of NSR violations by paying fines and installing equipment to eliminate 337,000 tons of pollution.

The courts have generally sided with the Clinton Administration's interpretation of NSR. In the first case to go to trial, the U.S. District Court for the Southern District of Ohio found that Ohio

⁵¹ NRDC, "32 Coal-Fired Power Plants in 13 States Now Up in the Air After Major Court Ruling on Mercury," Press Release, February 28, 2008, at <http://www.nrdc.org/media/2008/080228.asp>.

⁵² For the current status of the NSR lawsuits under EPA's Coal-Fired Power Plant Enforcement Initiative, see <http://www.epa.gov/compliance/resources/cases/civil/caa/coal/index.html>.

⁵³ Total emissions of SO₂ and NO_x from all sources nationwide were 37 million tons in 2003. Thus, settlements with the 21 utilities will eliminate about 5% of total emissions of the two pollutants.

Edison had violated the Clean Air Act 11 times in modifying its W. H. Sammis power plant.⁵⁴ The company subsequently settled the case, agreeing to spend \$1.1 billion to install controls that are expected to reduce pollution by 212,000 tons annually. A second case, involving Duke Energy, was initially decided in the utility's favor, but on appeal to the Supreme Court, the utility lost. The issue in that case involved whether EPA should consider the hourly emissions rate or the annual total of emissions in deciding whether to apply NSR. The U.S. District Court for the Middle District of North Carolina, in a decision upheld by the Fourth Circuit Court of Appeals, held that the company was not required to undergo NSR and install more stringent pollution controls since the maximum hourly emissions rate did not increase as a result of the modifications, even if annual emissions did increase.⁵⁵ On April 2, 2007, the Supreme Court overturned the lower court rulings in a unanimous decision, finding that EPA's regulations, promulgated in 1980, clearly specified an increase in actual annual emissions as the measure of whether a permit for a modification was required.⁵⁶

The Bush Administration promulgated a number of changes to the NSR regulations that would have made future enforcement of NSR less likely. In December 2002 and October 2003, the agency promulgated five sets of changes to the NSR rules. The most controversial were new regulations defining what constitutes routine maintenance.⁵⁷ The new regulations would have exempted industrial facilities from undergoing NSR (and thus from installing new emission controls) if the cost of the replacement components was less than 20% of the replacement value of the process unit. Using this benchmark, few, if any, plant modifications would trigger new pollution controls. Fifteen states, three municipalities, and several environmental groups filed suit to block this "equipment replacement / routine maintenance" rule. The rule was stayed by the U.S. Court of Appeals for the D.C. Circuit on December 24, 2003, and on March 17, 2006, a three-judge panel of the court unanimously struck the rule down.⁵⁸ In its decision, the court held that EPA's attempt to change the NSR regulations was "contrary to the plain language" of the Clean Air Act.⁵⁹

EPA proposed further changes to the NSR regulations on October 20, 2005, and September 14, 2006.⁶⁰ For the most part, these regulations have not been promulgated. Under the October 2005 proposal, power plants could have modified existing facilities without triggering NSR, provided that the facility's "maximum hourly emissions achievable" after the changes were no greater than the same measure at any point during the past five years. The new rule would have effectively allowed increases in annual emissions without an NSR permit, if a modification led to an increase in the hours of operation of a facility. The agency's proposal stated that this change would establish a uniform national emissions test, in conformance with the Fourth Circuit's decision in the *Duke Energy* case, and it downplayed the significance of the change in light of "substantial

⁵⁴ *United States v. Ohio Edison Co.*, 276 F. Supp. 2d 829 (S.D. Ohio 2003).

⁵⁵ *United States v. Duke Energy Corp.*, 278 F.Supp. 2d 619 (M.D.N.C. 2003), *affirmed*, 411 F. 3d 539 (4th Cir., 2005).

⁵⁶ *Environmental Defense v. Duke Energy Corp.*, 549 U.S. 561 (2007).

⁵⁷ U.S. EPA, "Prevention of significant deterioration and nonattainment new source review; routine maintenance, repair and replacement," 68 *Federal Register* 61247, October 7, 2003.

⁵⁸ *New York v. EPA*, 443 F.3d 880 (D.C. Cir. 2006) cert. denied, 127 S.Ct. 2127 (2007).

⁵⁹ *Id.* at 883.

⁶⁰ U.S. EPA, "Air pollution; standards of performance for new stationary sources: Electric generating units; emissions test," 70 *Federal Register* 61081, October 20, 2005, and "Prevention of significant deterioration and nonattainment new source review; debottlenecking, aggregation, and project netting," 71 *Federal Register* 54235, September 14, 2005. The September 2006 proposal, parts of which were finalized January 13, 2008, would limit application of NSR by allowing plants to consider emissions only from the unit undergoing modification, rather than the entire plant, in determining whether NSR applies.

emissions reductions from other CAA [Clean Air Act] requirements that are more efficient,”⁶¹ an allusion to CAIR.

Since that time, both of these justifications have disappeared—the Fourth Circuit decision being overturned by the Supreme Court, and the “more efficient” reduction requirements (CAIR) having been vacated by the D.C. Circuit. Thus, the rule has not been promulgated.

At Congress’s direction, the National Academy of Sciences began a review of the NSR program in May 2004. An interim report, released in January 2005, said the committee had not reached final conclusions, but it also said, “In general, NSR provides more stringent emission limits for new and modified major sources than EPA provides in other existing programs” and “It is ... unlikely that Clear Skies [the Bush Administration’s proposed multi-pollutant legislation] would result in emission limits at individual sources that are tighter than those achieved when NSR is triggered at the same sources.”⁶² The final report, issued July 21, 2006, was ambivalent in many of its conclusions, but it found that

[m]ore than 60% of all coal-fired electricity-generation capacity in the United States currently lacks the kinds of controls for SO₂ and NO_x emissions that have been required under NSR. Also, the older facilities are more likely than newer facilities to undergo maintenance, repair, and replacement of key components, so a substantial portion of emissions from the electricity-generating sector is potentially affected by the NSR rule changes.⁶³

Besides the NAS study, on April 21, 2003, the National Academy of Public Administration (NAPA) released a report commissioned by Congress that made sweeping recommendations to modify NSR. The study panel recommended that Congress end the “grandfathering” of major air emission sources by requiring all major sources that have not obtained an NSR permit since 1977 to install Best Available Control Technology or Lowest Achievable Emissions Rate control equipment. In the interim, the NAPA panel concluded, the EPA and the Department of Justice should continue to enforce NSR vigorously, especially for changes at existing facilities.⁶⁴

The continuing controversy over NSR, the court decisions involving CAIR and CAMR, and the prominence of the electric power industry’s CO₂ emissions might all be addressed through multi-pollutant legislation. On the other hand, legislation addressing emissions from utilities found itself competing with economy-wide climate change cap-and-trade legislation which had priority both in the 111th Congress and the Administration.

Air Quality Standards

Background

Air quality has improved substantially since the passage of the Clean Air Act in 1970: annual emissions of the six most widespread (“criteria”) air pollutants have declined nearly 180 million

⁶¹ 70 *Federal Register* 61083, October 20, 2005.

⁶² National Research Council of the National Academies, *Interim Report of the Committee on Changes in New Source Review Programs for Stationary Sources of Air Pollutants* (Washington, DC: The National Academies Press, 2005), p. 27.

⁶³ National Research Council of the National Academies, *New Source Review for Stationary Sources of Air Pollutants* (Washington, DC: The National Academies Press, 2006), Prepublication Copy, p. 3.

⁶⁴ National Academy of Public Administration, *A Breath of Fresh Air: Reviving the New Source Review Program*, Summary Report, April 2003, p. 3.

tons (59%), despite major increases in population, motor vehicle miles traveled, and economic activity.⁶⁵ Nevertheless, the goal of clean air continues to elude many areas, in part because scientific understanding of the health effects of air pollution has caused EPA to tighten standards for most of the criteria pollutants.

The most widespread problems involve ozone and fine particles. As of September 2010, 119 million people lived in areas classified “nonattainment” for the ozone National Ambient Air Quality Standard (NAAQS);⁶⁶ 70 million lived in areas that were nonattainment for the fine particle (PM_{2.5}) NAAQS.⁶⁷ EPA attributes at least 33,000 premature deaths and millions of lost work days annually to exceedances of the PM_{2.5} standard. Recent research has tied ozone pollution to premature mortality as well.

Violations of the ambient air quality standards for the other four criteria pollutants are not as widespread, but EPA is engaged in (or has recently completed) reviews indicating that health effects of most of these pollutants are more serious than previously thought. At present, for example, no areas exceed the NAAQS for sulfur dioxide (SO₂), but in a recent review, EPA determined that between 2,300 and 5,900 premature deaths can be avoided annually by strengthening that standard. Thus, the agency has promulgated a new SO₂ standard under which as many as 59 counties could be designated nonattainment, based on the most recent monitoring data.⁶⁸

Table 1 summarizes EPA’s recent efforts to review the NAAQS and implement revisions, including the next steps for each of the six criteria pollutants. Revisions for five of the six pollutants (ozone, PM, lead, NO₂, and SO₂) have been completed since 2006, with the standards being made more stringent in each case (three of the five were subsequently challenged in court and two of these three were remanded to the agency for further revisions). Reviews of the NAAQS for carbon monoxide and the two remanded standards (ozone and PM) are to be completed in 2010 or 2011.⁶⁹

Table 1. Status of NAAQS Reviews

Pollutant	Last Revision	Court Action?	Next Steps	Monitoring Issues?	Comments
ozone	March 27, 2008; revised standards were proposed	In response to suits filed by 15 states (<i>Mississippi v.</i>	Final standards are expected to be promulgated by the end of	Only 675 of the nation’s 3,000 counties have ozone monitors:	March 2008 primary (health-based) standards were set at a

⁶⁵ See U.S. EPA, “Air Emissions Summary Through 2005,” at http://www.epa.gov/air/airtrends/2006/emissions_summary_2005.html, updated with data from 2008 in U.S. EPA, “Air Quality Trends,” at <http://www.epa.gov/airtrends/aqtrends.html#comparison>. The six criteria pollutants are ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxides, and lead.

⁶⁶ Data for ozone nonattainment areas are from the U.S. EPA “Green Book,” at <http://www.epa.gov/oar/oaqps/greenbk/gntc.html>.

⁶⁷ Fine particles, as defined by EPA, consist of particulate matter 2.5 micrometers or less in diameter, abbreviated as PM_{2.5}. Data for PM_{2.5} nonattainment areas are also from the U.S. EPA “Green Book,” at <http://www.epa.gov/oar/oaqps/greenbk/gntc.html>.

⁶⁸ <http://www.epa.gov/air/sulfurdioxide/pdfs/20100602map0709.pdf>. The 59 potential nonattainment counties were identified using the most recent available monitoring data (2007-2009). EPA is likely to use 2009-2011 or later data when it comes time to actually designate the areas. Additional monitors will also be sited.

⁶⁹ There are CRS reports on three of the NAAQS revisions: CRS Report R41062, *Ozone Air Quality Standards: EPA’s Proposed January 2010 Revisions*, CRS Report RL34762, *The National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM): EPA’s 2006 Revisions and Associated Issues*, and CRS Report RL34479, *Revising the National Ambient Air Quality Standard for Lead*.

Pollutant	Last Revision	Court Action?	Next Steps	Monitoring Issues?	Comments
	January 19, 2010.	EPA, EPA agreed to reconsider the March 2008 standards.	December, 2010. Implementation of the 2008 NAAQS is stayed pending review.	Between 515 and 650 of these counties exceeded the proposed standard based on the most recent monitoring data. Ozone is increasingly seen as a regional pollutant that affects rural as well as urban areas, so more counties may need monitors. On July 14, 2009, EPA proposed to require that states monitor ozone concentrations in rural as well as urban areas.	level less stringent than recommended by EPA's science advisers. The revision also did not act on proposed changes to the form of the secondary (welfare) standard that would have more accurately addressed impacts on crops and forests. The January 2010 proposal addresses both of these issues.
particulate matter (PM _{2.5} and PM ₁₀)	October 17, 2006	The D.C. Circuit remanded the 2006 PM _{2.5} standards to EPA in February 2009 (<i>American Farm Bureau Federation v. EPA</i>).	EPA expects to propose a PM _{2.5} NAAQS by February 2011, with promulgation of final standards by October 2011. In an agency document released July 2, 2010, staff recommended substantially more stringent standards.	Environmental groups would like to see additional monitoring in areas with expected high concentrations (e.g., along highways, near ports, etc.).	October 2006 primary standards for PM _{2.5} were set at levels less stringent than recommended by EPA's science advisers.

Pollutant	Last Revision	Court Action?	Next Steps	Monitoring Issues?	Comments
sulfur dioxide (SO ₂)	On June 22, 2010, EPA revised the NAAQS, focusing on shorter-term (1-hour) exposures. The prior standards (for 24-hour and annual concentrations), which were revoked as part of the revision, were set in 1971. The new short-term standard is substantially more stringent, replacing a 24-hour standard of 140 parts per billion (ppb) with a 1-hour maximum of 75 ppb.	The D.C. Circuit remanded the SO ₂ standard to EPA in 1998, following an agency review that left the standard unchanged. The court found the Administrator had failed adequately to explain her conclusion that no public health threat existed from short term exposures to SO ₂ . (<i>American Lung Association v. EPA</i>)	EPA intends to designate nonattainment areas by June 2012.	The current SO ₂ monitoring network is not primarily configured to monitor locations of maximum short-term concentrations. The network needs 41 new monitoring sites, according to EPA. In a change from the agency's December 2009 proposal, EPA will rely primarily on dispersion modeling to assess compliance with the standard.	Since 1971, EPA had conducted three reviews of the SO ₂ standard without changing it.
carbon monoxide (CO)	Current primary standard was set in 1971. EPA revoked a secondary standard in 1985.	The U.S. District Court for the Northern District of California has ordered EPA to review the CO NAAQS by May 13, 2011. (<i>Communities for a Better Environment v. EPA</i>)	EPA must propose any revision to the CO NAAQS by January 28, 2011, with final action by August 12, 2011.	Uncertain.	Emissions of CO, largely from motor vehicles, have declined 56% since 1980, and few areas violate the existing CO NAAQS.
nitrogen dioxide (NO ₂)	EPA completed a review and promulgated a new 1-hour standard February 9, 2010. The new standard is in addition to the previous annual average standard, which was set in 1971.	A suit filed in 2005 charged that EPA had failed to review the NO ₂ standard in the last 5 years, as required by the Clean Air Act (<i>Center for Biological Diversity v. Johnson</i>). Under a 2007 consent decree, EPA	EPA expects to identify nonattainment areas by January 2012. However, the agency believes most areas will be "unclassifiable," due to the lack of adequate monitoring. Once an expanded network of NO ₂	Under EPA's new monitoring network, a monitor will be required near a major road in any urban area with a population of 350,000 or more. (The majority of NO ₂ emissions come from motor vehicles.)	There are no nonattainment areas for the annual standard, and only Cook County, IL (Chicago) violates the new 1-hour standard using current monitoring data. NO ₂ emissions have been more stringently controlled even

Pollutant	Last Revision	Court Action?	Next Steps	Monitoring Issues?	Comments
		proposed revisions to the primary standard July 15, 2009, and promulgated the revisions in February 2010.	monitors is fully deployed and three years of air quality data have been collected, the agency will redesignate areas (in 2016 or 2017) based on air quality data from the new monitoring network.	Community-wide concentrations would also be monitored in urban areas with populations of 1,000,000 or more.	though there have not been recent violations of the NO ₂ standard, because nitrogen oxides contribute to the formation of ozone, the standard for which has been reviewed and strengthened several times.
lead	November 12, 2008	Both environmental groups (which challenged the adequacy of the monitoring requirements) and industry (which challenged the standard itself) have petitioned for review (<i>Missouri Coalition for the Environment v. EPA and Coalition of Battery Recyclers Association v. EPA</i>). EPA granted a petition for reconsideration of the monitoring requirements in July 2009.	Revised monitoring rules were proposed December 23, 2009. The lawsuit challenging the standard itself is proceeding. 16 nonattainment areas were designated in November 2010.	In July 2009, EPA agreed to review the monitoring portions of its November 2008 NAAQS. At least 24 of the 50 states, including some with major sources of lead emissions, had no lead monitors at all. Under the 2008 regulations, 101 metro areas (those with populations greater than 500,000) would be required to have monitors as would an estimated 135 areas that have sources of lead emissions greater than or equal to one ton per year. Proposed regulations would lower the source threshold to 0.5 tons.	EPA's November 2008 action reduced the standard by 90%, from 1.5 micrograms per cubic meter (µg/m ³) to 0.15 µg/m ³ . Environmental groups, while generally pleased with the NAAQS itself, petitioned for reconsideration of the monitoring requirements, arguing that EPA should require more locations near emission sources to have monitors. Industry groups believe the standard itself is too stringent.

Judicial Reviews

As the table indicates, court challenges have played a key role in bringing about the NAAQS reviews, and in causing further review after the NAAQS have been promulgated. Reviews of most of the standards were stimulated at least in part by court cases: EPA is statutorily required to review the NAAQS every five years, and its failure to do so can be addressed by citizen suits.

At the other end of the process, once the agency's review of a NAAQS is completed, the standards are almost invariably challenged in court. In the case of both particulate matter and ozone, judicial review has led to a remand of the standards that EPA promulgated in 2006 and 2008 respectively. The agency has now agreed to promulgate further revisions to these standards in 2010 and 2011.

CASAC's Role

As the table indicates, in at least two cases, EPA's revised standards have been remanded at least in part because the agency did not follow the advice of its independent science advisors, the Clean Air Scientific Advisory Committee (CASAC). EPA is not required by statute to follow CASAC's recommendations; the act requires only that the Administrator set forth (in the *Federal Register* notice in which she proposes a NAAQS) any pertinent findings, recommendations, and comments made by CASAC and, if her proposal differs in an important respect from any of the recommendations, provide an explanation of the reasons for such differences.⁷⁰ But the failure to follow CASAC recommendations almost inevitably raises the question of whether the Administrator's decision will be judged arbitrary and capricious in a judicial review.

In the recent revisions of both the ozone and PM standards, CASAC made detailed objections to the Administrator's final decisions. The committee's description of the process as having failed to meet statutory and procedural requirements played an important role during judicial review. This raises the question of whether Congress might opt to strengthen CASAC's statutory role in the review process, or limit the Administrator's authority to reject CASAC's advice.

Adequacy of Monitoring

A feature common to many of the recent NAAQS reviews has been EPA's finding that the current monitoring network is inadequate to determine whether or not many areas of the country are in attainment of the standards. In several cases, such as for lead and sulfur dioxide, more extensive monitoring networks had been partly dismantled by the time the standards were reviewed, after years of indicating compliance with older, less stringent standards. In other cases, such as PM and NO₂, the monitoring network was not designed to measure the kinds of exposure that current research identifies as a cause of concern (e.g., exposure to fine particles near highways). As a result, EPA and the states will need to devote resources in the next few years to expanding and refocusing the monitoring networks in order to identify areas where air quality does not meet new standards.

NAAQS Implementation

Although most of the NAAQS standards are likely to have been revised by the end of 2011—ultimately stimulating billions of dollars in expenditures on pollution control—the impact of the new standards will be gradual. A NAAQS does not directly limit emissions; rather, a primary NAAQS represents the Administrator's formal judgment regarding the level of ambient pollution

⁷⁰ The requirement is found in Section 307(d)(3) of the act.

below which public health will be protected with an adequate margin of safety; a secondary standard reflects her judgment as to the level of ambient pollution necessary to protect public welfare, including protection of the environment, water quality, building materials, etc.

Promulgation of a NAAQS sets in motion a lengthy process under which states and the EPA first identify nonattainment areas. Those areas then undertake a complicated implementation process. The first step, designation of nonattainment areas, generally takes at least two years after a standard is promulgated, and in many cases longer, if a new monitoring network needs to be established. After nonattainment areas are formally designated, the states generally have three years to submit State Implementation Plans (SIPs) that identify the specific regulations and emission control requirements that will bring the area into attainment.

Whether more stringent NAAQS will lead to stronger *federal* emission controls for the sources of pollution—in addition to the controls contemplated by individual states or metropolitan areas—is likely to be an important issue. Several of the criteria pollutants have impacts across state lines, far from the source of emissions; others (notably ozone) form in the atmosphere as the result of chemical reactions involving precursors that may have been emitted many miles upwind. Thus, measures taken by individual states and nonattainment areas to control emissions within their borders may be inadequate for the areas to attain a NAAQS. Federal standards for cars, trucks, power plants, and other major pollution sources could need strengthening for many areas to be able to attain the NAAQS.

Congress has given EPA the authority to strengthen such emission standards; but Congress may still act to review the implementation of that authority.

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